



# EFFECT OF TEACHING THROUGH 5E LEARNING APPROACH ON SELF-CONFIDENCE, SELF-EFFICACY, SELF-REGULATED LEARNING AND ACADEMIC ACHIEVEMENT

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## INTRODUCTION:

5E Learning Cycle Model is a systematically organized cycle that gives real science experiences that leads to the construction of knowledge, incorporates hands on activity, reading science text, directed discussion and problem solving. In 5E Learning Cycle Model, learning occurs not by passive reception of transmitted information, but by active interaction with objects and ideas. The learner is the person who creates new understanding for him/herself and the teacher provides activities that engage the child's mind as well as hands that will lead to the cognitive development. The humanistic approach of this learning cycle model views teaching as experiential-based and is rooted in beliefs that learners construct their own knowledge in socially organized environments.

Life is full of difficulties and surprises. Intelligence and self-confidence plays an important role in preparing all of us to confront these challenges and accepting these surprises as effectively as possible. To reflect a person's overall emotional evaluation of his or her own worth, Self-confidence is a term used in psychology. Sieler (1998), "Self-confidence is an individual's characteristic (a self-construct) which enables a person to have a positive or realistic view of themselves or situations that they are in." According to Stevens (2005), "It refers to a person's expectation of his or her ability to achieve a goal in a given situation and is a very influential factor in ensuring a person's potential."

According to Albert Bandura, self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations". In other words, self-efficacy is a person's belief in his or her ability to succeed in a particular situation.

Self-regulation is essential element for the growth of the students through the learning process (Zimmerman, 2008). It helps students to create creative learning habits and strengthens their learning skills (Wolters, 2011), adopting learning strategies to enhance academic performance (Frizzelle, & Graham, 2005), regulating their performance (Harris et al., 2005), and self-concept for their academic progression (De Bruin, Thiede & Camp, 2011). Thus it is essential for teacher to become familiar with the factors which influence the learner's ability to self-regulate and also to develop such strategies which may help to regulate the self-learning. The self-motivation plays crucial role in enhancing the self-regulatory learning and also important for the growth of the academic outcomes (Zimmerman, 2008). Achieving the goal of Self-regulatory learning is not possible without self-motivation.

## An Overview:

Nair (2012) applied survey design to study "the Constructivism as An effective pedagogy: perception of Teachers". Sample of the study consisted of 35 upper primary school teacher from Alappuza district. She used group discussion and interview technique for collection of data. The study revealed that most of the teachers' opinioned that Constructivist approach is very effective in transacting knowledge at primary school level.

Maikhuri, (2015) conducted a study on —Self-confidence of adolescents in relation to their Academic achievement revealed that there is no significant correlation between academic achievement and Self Confidence. However, significant differences were observed in the academic achievement to the high and low self-confidence groups.

Multon (1991) tested meta-analytically the hypothesis that self-efficacy beliefs relate positively to academic performance and persistence. Results revealed positive and statistically significant relationships between self-efficacy beliefs and academic performance and persistence outcomes across a wide variety of subjects, experimental designs and assessment methods.

Cunningham, et al., (2000) conducted a study with suburban elementary school students. The intent of the research was to employ goal setting and evaluation strategies to alleviate or minimize six target behaviours, i.e. goal settings, social comparison, self-verbalization followed by self-observation, self-judgments and self-reaction. Through the six processes the learners' achieves the Self-regulation.

## STATEMENT OF THE PROBLEM:

The present article aims at studying the "Effect of Teaching through 5E Learning Approach on Self-confidence, Self-efficacy, Self-regulated Learning and Academic Achievement".

## Variables:

Following are the dependent and independent variables :

**Independent Variable:** Constructivist Instructional Method of Teaching involving 5E (Engage, Explore, Explain, Elaborate and Evaluate) Learning

**Dependent Variables:** (i) Self-confidence ; (ii) Self-efficacy ; (iii) Self-regulated Learning ; (iv) Academic Achievement in Physics

## HYPOTHESES:

1. There is a significant difference between the effectiveness of 5E Learning and Traditional Classroom Teaching with regard to Self-confidence of students.
2. There is a significant difference between the effectiveness of 5E Learning and Traditional Classroom Teaching with regard to Self-efficacy of students.
3. There is a significant difference between the effectiveness of 5E Learning and Traditional Classroom Teaching with regard to Self-regulated learning of students.
4. There is a significant difference between the effectiveness of 5E Learning and Traditional Classroom Teaching with regard to Academic Achievement of students in Physics.

## DEFINITIONS OF TECHNICAL TERMS:

**Self-confidence:** Self-confidence is an attitude which allows individuals to have positive and realistic views of themselves. It effect directly or indirectly student's adjustment behaviour as well academic motivation and further these factors affect student's participation at school level. Usually it is seen that those students who are not able to adjust themselves properly in the school or in the classroom become isolates and they do not take part in the curricular and co-curricular activities.

**Self-Efficacy:** The term self-efficacy was introduced by Bandura (1977) as part of his social cognitive theory. He used the concept of reciprocal determinism to explain that each behavioural, personal, and environmental factor influences—and is also influenced by—the other factors. Later, he argued that, "People's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true." Self-efficacy represents the belief that an individual possesses and is defined as, "the beliefs in one's capability to organize and execute the courses of action required to produce given attainments".

**Self-regulated Learning:** Self-regulation of learning is a process that required students to get involved in their personal, behavioural, motivation and cognitive learning tasks in order to accomplish important valuable academic goals. Self-regulated Learning is defined as the ability of the students to self-plan, self-observe, self-analyse, self-judge and self-evaluate the learning and learning related activities and it is measured through the Self-regulated Learning Scale.

## Research Method:

The study was quasi-experimental non-equivalent group design with a pre-test and a post-test (Gray, 2013). The design was used because participants selected for the study will be from two different secondary schools in the same area. Participants in the study were considered in two groups : Experimental group and Control group. The experimental group participated in the constructivist instructional method involving 5E learning while the control group participated in conventional methods of instruction.

**Sample:**

In the present study 50 students of Class IX (Physics) were selected as the sample. The present study was an experimental study therefore a very large size of sample could not be taken. Students studying in government secondary schools in Honnavar taluka (Uttara Kannada district) was selected.

**Tools Used:**

1. Constructivist Instructional Material based on 5E Learning constructed by investigator
2. Self-confidence Scale inventory developed by using scientific procedure
3. Self-efficacy Scale constructed by Schwarzer, R., & Jerusalem, M. (1995) was adopted
4. Self-regulated Learning Scale constructed by investigator

**Collection of Data:**

Data relating to the self-confidence, self-efficacy, and self-regulated learning were collected by administering the scales to the students before giving the treatment. The conventional group was taught by a regular teaching science subject and experimental group was taught by a researcher using the constructivist instructional method involving 5E learning. The subject content in Physics (Motion) was taught for both the groups for nearly six weeks. At the end of the treatment the post-test scores were collected by administering the same tools to the two groups of students. Data relating to achievement of the students in the Physics (Motion) were obtained from the achievement test constructed and administered by the investigator.

**Statistical Technique:**

't' test : 't' test is test of the significance of the difference between two means is known as 't' test. In the present study 't' test was applied to find out the significance of mean difference of different groups.

**ANALYSIS AND RESULTS:**

**Null Hypothesis:** There is no significant difference between the effectiveness of 5E Learning and Traditional Classroom Teaching with regard to Self-confidence of students.

**Table 1: Comparison between 5E Learning and Traditional Classroom Teaching with Regard to Self-confidence of Students**

Teaching Methods	n	Mean	SD	t-value	P-value	Significance
5E Learning	50	382.66	7.91	26.696	< 0.05	Yes
Traditional	50	276.14	27.08			

The obtained 't' value 26.6964 with respect to effectiveness of Constructivist Instructional Method involving 5E Learning and Traditional Classroom Teaching on post-test scores of Self-confidence of students is greater than the tabled 't' value (1.96) at 0.05 level of significance. It is, therefore, concluded that the two groups differ significantly in respect of the variable under consideration. That is, the null hypothesis that there is no significant difference between the effectiveness of constructivist instructional method of teaching involving 5E learning and traditional classroom teaching on post-test scores of self-confidence of students is rejected and alternative hypothesis is accepted. Further, it is noticed that mean of 5E learning on self-confidence scores is greater than that of traditional classroom teaching scores. Hence, it is concluded that constructivist instructional method of teaching involving 5E learning is more effective in developing the self-confidence among students than the traditional classroom teaching method.

**Finding:**

The constructivist instructional method of teaching involving 5E learning is more effective in developing the self-confidence among students than the traditional classroom teaching method.

**Null Hypothesis:** There is no significant difference between the effectiveness of 5E Learning and Traditional Classroom Teaching with regard to Self-efficacy of students.

**Table 2: Comparison between 5E Learning and Traditional Classroom Teaching with Regard to Self-efficacy of Students**

Teaching Methods	n	Mean	SD	t-value	P-value	Significance
5E Learning	50	88.18	2.88	21.1579	< 0.05	Yes
Traditional	50	54.82	10.77			

The obtained 't' value 21.1579 with respect to effectiveness of Constructivist Instructional Method involving 5E Learning and Traditional Classroom Teaching on post-test scores of Self-efficacy of students is greater than the tabled 't' value (1.96) at 0.05 level of significance. It is, therefore, concluded that the two groups differ significantly in respect of the variable under consideration. That is, the null hypothesis that there is no significant difference between the effectiveness of constructivist instructional method of teaching involving 5E learning and traditional classroom teaching on post-test scores of self-efficacy of students is rejected and alternative hypothesis is accepted. Further, it is noticed that mean of 5E learning on self-efficacy scores is greater than that of traditional classroom teaching scores. Hence, it is concluded that constructivist instructional method of teaching involving 5E learning is more effective in developing the self-efficacy among students than the traditional classroom teaching method.

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**Finding:**

The constructivist instructional method of teaching involving 5E learning is more effective in developing the self-efficacy among students than the traditional classroom teaching method.

**Null Hypothesis:** There is no significant difference between the effectiveness of 5E Learning and Traditional Classroom Teaching with regard to Self-regulated learning of students.

**Table 3: Comparison between 5E Learning and Traditional Classroom Teaching with Regard to Self-regulated Learning of Students**

Teaching Methods	n	Mean	SD	t-value	P-value	Significance
5E Learning	50	38.58	0.84	14.2051	< 0.05	Yes
Traditional	50	30.50	3.93			

The obtained 't' value 14.2051 with respect to effectiveness of Constructivist Instructional Method involving 5E Learning and Traditional Classroom Teaching on post-test scores of Self-regulated Learning of students is greater than the tabled 't' value (1.96) at 0.05 level of significance. It is, therefore, concluded that the two groups differ significantly in respect of the variable under consideration. That is, the null hypothesis that there is no significant difference between the effectiveness of constructivist instructional method of teaching involving 5E learning and traditional classroom teaching on post-test scores of self-regulated learning of students is rejected and alternative hypothesis is accepted. Further, it is noticed that mean of 5E learning on self-regulated learning scores is greater than that of traditional classroom teaching scores. Hence, it is concluded that constructivist instructional method of teaching involving 5E learning is more effective in developing the self-regulated learning among students than the traditional classroom teaching method.

**Finding:**

The constructivist instructional method of teaching involving 5E learning is more effective in developing the self-regulated learning among students than the traditional classroom teaching method.

**Null Hypothesis:** There is no significant difference between the effectiveness of 5E Learning and Traditional Classroom Teaching with regard to Academic Achievement of Students in Physics.

**Table 4: Comparison between 5E Learning and Traditional Classroom Teaching with Regard to Academic Achievement of Students in Physics**

Teaching Methods	n	Mean	SD	t-value	P-value	Significance
5E Learning	50	45.52	2.27	28.7049	< 0.05	Yes
Traditional	50	19.68	5.95			

The obtained 't' value 14.2051 with respect to effectiveness of Constructivist Instructional Method involving 5E Learning and Traditional Classroom Teaching on post-test scores of Academic Achievement of students in Physics is greater than the tabled 't' value (1.96) at 0.05 level of significance. It is, therefore, concluded that the two groups differ significantly in respect of the variable under consideration. That is, the null hypothesis that there is no significant difference between the effectiveness of constructivist instructional method of teaching involving 5E learning and traditional classroom teaching on post-test scores of academic achievement of students in Physics is rejected and alternative hypothesis is accepted. Further, it is noticed that mean of 5E learning on academic achievement of students in Physics scores is greater than that of traditional classroom teaching scores. Hence, it is concluded that constructivist instructional method of teaching involving 5E learning is more effective in improving the academic achievement of students in Physics than the traditional classroom teaching method.

**Finding:**

The constructivist instructional method of teaching involving 5E learning is more effective in improving the academic achievement of students in Physics than the traditional classroom teaching method.

**DISCUSSION:**

It revealed from the findings of the study that, the Constructivist Instructional Method involving 5E Learning is more effective in bringing about the desirable changes in the Self-confidence, Self-efficacy, Self-regulated learning as well as in Academic Achievement of secondary school students. Calik, Ayas and Coll (2010), Nagalakshmi (2011), Padmanabhan and Rao (2011), Nayak (2011),

Ramanath and Sivakumar (2011), Tandel (2012), Nayar and Senapaty (2011), Muhanty and Zubair (2012), Kablan and Kaya (2014), Khan (2014), Akanwa and Ovute (2014), Ramulu (2015) conducted an investigation on "effectiveness of constructivist approach on student's achievement in science, science related attitude, science process skills and perception of nature of science at secondary level".

#### CONCLUSION:

It follows from the findings that Constructivist Instructional Method involving 5E Learning has impact on Self-confidence, Self-efficacy, Self-regulated learning as well as on Academic Achievement of secondary school students.

#### Educational Implications:

The 5E Learning Cycle Model is an effective way in terms of helping students enjoy Science, understand content, and apply scientific processes and concepts to authentic situations. By cultivating student's interest in Science and developing reasoning skills, this model promotes deeper understanding of the nature of science and scientific inquiry.

5E model exposes students to problem situations (engage their thinking) and then provides opportunities to explore, explain and evaluate their learning. The learner asks questions, and these questions lead to the desire for answers to the questions or the solutions to the problem and that results in the beginning of exploration and hypotheses. These hypotheses lead to an investigation to test the hypotheses or find answers and solutions to the problem and the construction of knowledge based on the investigative findings. The learner discusses and reflects on this newly acquired knowledge, which in turn leads to more questions and further investigation. Teacher should facilitate safe, guided or open inquiry experiences and questioning so that the students might uncover their misconceptions about the concept.

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